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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

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U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

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INTERNATIONAL APPLICATION NO.  
PCT/US99/16380INTERNATIONAL FILING DATE  
20July1999 (20.07.99)PRIORITY DATE CLAIMED  
20July1998 (20.07.98)

## TITLE OF INVENTION

DIGITAL VIDEO APPARATUS USER INTERFACE

## APPLICANT(S) FOR DO/EO/US

Debbie Indira Lewis, Pratish Ratilal Desai and Robert Howard Miller

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
  - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☒ has been transmitted by the International Bureau.
  - c. ☒ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210). attached to Item 13
8. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☒ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

## Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98. with references attached
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☒ Certificate of Mailing by Express Mail
20. Return Postcard Receipt

20. ☐ Other items or information:**CERTIFICATE OF MAILING UNDER 37 CFR 1.10**

EL667108782US

18 January 2001

"Express Mail" mailing no.

Date of Deposit

I hereby certify that this application is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Davida Fornarotto

Typed or printed name of person  
mailing application

*Davida Fornarotto*  
Signature of person mailing  
application

21. The following fees are submitted:

## BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

- ☐ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO .....\$1000.00
- ☒ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO .....\$860.00
- ☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO .....\$710.00
- ☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) .....\$690.00
- ☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) .....\$100.00

ENTER APPROPRIATE BASIC FEE AMOUNT =

860.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	12 - 20 =	0	x \$18.00
Independent claims	3 - 3 =	0	x \$80.00

Multiple Dependent Claims (check if applicable). ☐

TOTAL OF ABOVE CALCULATIONS = 860.00

Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable). ☐

SUBTOTAL = 860.00

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). +

TOTAL NATIONAL FEE = 860.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). ☐

TOTAL FEES ENCLOSED = 860.00

09/744111 00000052 070832 09744111  
 Serial Ref: 00000098 Draw: 070832 09744111  
 07-0832 860.00 CH

Amount to be refunded	\$
charged	\$ 860.00

A check in the amount of to cover the above fees is enclosed.

- ☒ Please charge my Deposit Account No. 07-0832 in the amount of \$860.00 to cover the above fees.  
 A duplicate copy of this sheet is enclosed.

- ☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 07-0832 A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Mr. Joseph S. Tripoli  
 THOMSON multimedia Licensing Inc.  
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 PO Box 5312  
 Princeton, New Jersey 08540

SIGNATURE

Paul P. Kiel

NAME

40,677

REGISTRATION NUMBER

January 18, 2001

DATE

J002 Rec'd PCT/PTO 1 8 JAN 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Debbie Indira Lewis and Robert Howard Miller  
Filed : Herewith  
For : DIGITAL VIDEO APPARATUS USER INTERFACE

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231

Sir:

In the US national phase application of PCT/US99/16228 filed herewith, please enter the following amendments:

IN THE SPECIFICATION:

Please amend the specification as follows:

On Page 1, following the title, insert:

-- This application claims the benefit under 35 U.S.C. § 365 of International Application PCT/US99/16228, filed July 20, 1999, which claims the benefit of U.S. Provisional Application Serial No. 60/093,424, filed July 20, 1998.--

On Page 3, line 21, change "display unit 18" to read -- display unit--;

line 30, change "video display device 18" to read -- video display device--;

On Page 4, line 26, change "information display 75" to read -- information display block 66-- ;

On Page 7, line 22, change "designated button 81" to read -- designated button--.

IN THE CLAIMS:

Please amend the claims (which are the annexes of the International Preliminary Examination Report) as follows:

1.(AMENDED) A method for controlling a system for processing a plurality of data units stored on a storage medium, the system adapted to process a sequence of the data units in accordance with one of a plurality of playmodes (PMs) comprising standard, random and programmed playmodes, the method comprising the steps of:

(A) playing back [(127)] a sequence of data units according to one of the plurality of playmodes during a PLAY mode of operation, [characterized by] wherein

(B) providing [(134)] to a user, during the PLAY mode of operation, an opportunity to select another one of the plurality of playmodes, the plurality of playmodes including a standard playmode representing a default sequence, a random playmode representing a random sequence and programmed playmode representing a sequence specified by a user, without interrupting playback of a current sequence of data units, and

(C) in response to user selection of a new playmode, changing [(138)] the playback sequence of the data units in accordance with the newly selected playmode.

2.(AMENDED) The method of claim 1, [characterized in that] wherein step (B) comprises the step of generating [(134)] an on-screen display overlaid onto a video display which allows the user to select one of the plurality of playmodes while continuing to watch the playback of the data units in a background portion of the video display.

3.(AMENDED) The method of claim 2, [characterized in that] wherein step (B) is preceded by the step of determining [(144)] whether a mode of operation enabling selection of one of the plurality of playmodes during the PLAY mode of operation is enabled; and

performing steps (B) and (C) only if the mode of operation enabling modification of the plurality of playmodes during the PLAY mode of operation is enabled.

4.(AMENDED) The method of claim 3, [characterized in that] wherein the step of determining whether user modification of a playmode is enabled is preceded by the step of determining [(127,128)] whether the system is in the PLAY mode of operation.

5.(AMENDED) The method of claim 4, [characterized in that] wherein:  
the system comprises a DVD player [(30)] and the storage medium  
comprises a DVD disk;  
the DVD disk includes a plurality of chapters; and  
the plurality of playmodes represent respectively different sequences of  
chapters.

6.(AMENDED) The method of claim 1, [characterized in that] wherein step  
(B) comprises the steps of:

determining [(130)] the maximum number of the plurality of playmodes  
which may be performed with the storage medium;

determining [(132)] which of the number of the maximum number of the  
plurality of playmodes are actually possible with the storage medium;

generating [(134)] an on-screen menu displaying the maximum number of  
the plurality of playmodes, and which of the maximum number of the plurality of  
playmodes are actually possible .

7.(AMENDED) The method of claim 6, [characterized in that] wherein step  
(B) further comprises, after the generating step, a step of allowing [(136)] the user  
to select from among the plurality of playmodes actually possible on the storage  
medium.

8.(AMENDED) The method of claim 1, [characterized in that] step (C) is  
preceded by the step of allowing the user to select whether the newly selected  
playmode will be effective for all future playbacks or only the current playback.

9.(AMENDED) Apparatus for processing data units stored on a storage  
medium according to a particular playback sequence, the apparatus comprising:  
playback circuitry [(26,27,28,30)] for accessing and processing data units  
stored on the storage medium during a PLAY mode of operation;  
a user control device [(41)] for receiving user input; and  
a control unit [(40)], coupled to the playback circuitry and the user control  
device, for conditioning the playback circuitry to activate the PLAY mode of  
operation and process the data units in a particular playback sequence in response to  
user selection of one of a plurality of playmodes, [characterized in that] wherein  
the control unit provides to a user during the PLAY mode of operation an  
opportunity to select from among the plurality of playmodes, the plurality of  
playmodes including a standard playmode representing a default sequence, a

random playmode representing a random sequence and programmed playmode representing a sequence specified by a user, without interrupting the PLAY mode of the playback circuitry, and, in response to user selection of a new playmode, changing the playback sequence of the data units in accordance with the newly selected playmode.

10.(AMENDED) The apparatus of claim 9, further [characterized by] comprising an on-screen display control [(35)] coupled to the control unit [(40)], the on-screen display control providing a menu [(110)] representing the plurality of playmodes allowing the user to select one of the plurality of playmodes while watching a playback of a current sequence of data units in a background portion of the video display.

11.(AMENDED) The apparatus of claim 9, [characterized in that] wherein the control unit determines whether a mode of operation enabling selection of one of the plurality of playmodes during the PLAY mode of operation is enabled; and provides an opportunity to select a new playmode without interrupting the PLAY mode only if the mode of operation enabling modification of the plurality of playmodes during the PLAY mode of operation is enabled.

12.(AMENDED) The apparatus of claim 9, [characterized in that] wherein the playback circuitry comprises means for accessing and processing data from a DVD disk and the storage medium comprises a DVD disk, wherein the DVD disk includes a plurality of chapters; and the plurality of playmodes represent respectively different sequences of chapters.

13.(AMENDED) The apparatus of claim 9, [characterized in that] wherein control unit is adapted to determine the maximum number of the plurality of playmodes which may be performed with the storage medium, to determine which of the number of the maximum number of the plurality of playmodes are actually possible with the storage medium, and to provide an on-screen menu displaying the maximum number of the plurality of playmodes and which of the maximum number of the plurality of playmodes are actually possible.

14.(AMENDED) The apparatus of claim 9, [characterized in that] wherein the control unit provides an on-screen display to allow the user to select whether the newly selected playmode will be effective for all future playbacks or only the current playback.

## IN THE ABSTRACT:

Please add the following Abstract.

-- A method for controlling a system for processing stored information stored on a storage medium, the system including a plurality of playmodes (PMs) representing respectively different processing sequences, includes the following steps. A sequence represented by one of the plurality of PMs is played back during play mode of operation. An opportunity is provided to a user, during the play mode of operation, to select a PM from among the plurality of PMs. Then the sequence represented by the selected PM is played back during the play mode of operation. Apparatus for processing information, in this manner includes playback circuitry for retrieving information from the storage medium during a play mode of operation in one of the plurality of PMs. A user control device receives user input. A control means conditions the playback circuitry to assume a play mode of operation, select one of the plurality of PMs during the play mode of operation in response to the user input, and change to retrieve the selected one of a plurality of PMs during the play mode of operation.--

## IN THE DRAWINGS:

In Figure 1, the disc player should be designated --24-- instead of "21"; and

In Figures 6 and 7, change the references to "Repeat Mode" to read -- Play Mode (PM)--.

## REMARKS

The specification has been amended to include a reference to the priority applications and to correct obvious errors.

The above amendments to the claims have been made to eliminate reference indicia and to meet the requirements of the United States.

To meet the requirements of the United States, the Abstract (as originally filed in the PCT application) is added.

The drawings have been amended to correct obvious errors.

No fee is believed to have been incurred by virtue of this amendment. However if a fee is incurred on the basis of this amendment, please charge such fee against deposit account 07-0832

Respectfully submitted,  
Debbie Indira Lewis  
Robert Howard Miller



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January 18, 2001



DIGITAL VIDEO APPARATUS USER INTERFACE

The present invention relates to a user interface for a digital video apparatus, and in particular, a user interface for a digital video apparatus capable of processing a plurality of data blocks according to a user selected playmode.

Video signal processing systems that utilize storage media having digitally compressed video and audio information recorded thereon can give the user a vast number of options for controlling playback of a video title stored on such a media. One such system that is gaining rapid acceptance comprises a video disc player adapted to process information stored in accordance with the digital video disc (DVD) specification. The information on a DVD formatted disc is recorded as discrete packets of data, in accordance with the applicable video and audio data compression standards, wherein designated packets carry data associated with various data streams, such as alternative video angles, audio tracks, subpicture streams, etc. A disc player reading a DVD formatted disc may be controlled to display certain packets of data and skip over others in this manner, the DVD system can be used to prevent unauthorized access to information on a particular disc as well as seamlessly provide multiple variations of a video title, such as multiple camera angles and story endings, in accordance with user commands.

EP0847197A discloses a device for seamlessly reproducing a bitstream containing noncontinuous system time information. In particular, EP0847197A discloses an authoring system that encodes a multimedia bitstream that can be reproduced according to one scenario selected from a plurality of scenarios. The scenarios can be changed during playback, i.e., in response to user selection of a new scenario a new multimedia scenario is dynamically generated according to the most recently selected scenario. It is also possible to dynamically select and reproduce any one of the plurality of scenarios while reproducing the title content according to a desired scenario.

One useful aspect of the DVD system is that it allows the user to playback the disc contents using one of a plurality of playmodes. DVD formatted discs are generally authored to include one or more video titles,

wherein each video title corresponds to a designated program unit, such as a movie or a television episode. Each video title may in turn be divided into one or more part-of-title units, also called chapters, wherein each chapter corresponds to a predetermined portion of the video title. Under this format, a disc player

5 may be configured to playback the chapters of a particular video title in one of a plurality of playmodes. The available playmodes usually include: 1) standard, wherein the disc player plays the disc in the default sequence, usually from beginning to end; 2) random, wherein the chapters are played back in random order; and 3) program, wherein the chapters are played back in a sequence

10 programmed by the user.

To change a disc player's playmode setting, a user ordinarily must stop disc playback, call up the appropriate player set-up menu, make the necessary

selections and restart the disc playback. Even if the user is not directly required to start and stop disc playback, the disc player automatically halts playback of the disc and restarts the disc when the user selects the playmode. If the user wishes to change the playmodes frequently, the requirement to stop disc playback and navigate the disc player set-up menu can quickly become annoying. Therefore, it is desirable to allow the user to dynamically change the disc player's playmode setting during disc playback, that is, change the playmode as the video title continues to play in a portion of the display.

In accordance with the present invention a user interface, method and apparatus is provided for allowing a user to dynamically change a playmode of a digital video apparatus, in particular a DVD player. Advantageously, the present invention allows the user to dynamically change the player's playmode setting without having to stop playback of a title and then call up and navigate through the player set-up menu.

The invention will be described with reference to the accompanying drawings, wherein:

Fig. 1 is a block diagram of a digital video disc player suitable for implementing the dynamic playmode selection feature of the present invention;

Fig. 2 is a block diagram illustrating navigation between the disc player domain and the DVD domain;

Fig. 3 is a diagram of a data structure in accordance with the DVD specification;

Fig. 4 is a block diagram of a presentation structure in accordance with the DVD specification;

Fig. 5 is an on-screen display suitable for use with the dynamic playmode selection feature of the present invention;

Figure 6 is a flowchart illustrating the steps for implementing the displaying of and dynamically selecting among particular ones of a plurality of PMs on a DVD Player; and

Figure 7 shows, in flowchart form, another embodiment of the method for implementing the displaying and dynamically selecting among a plurality of PMs on a DVD disk on a DVD Player in accordance with principles of the invention.

Although the exemplary embodiment is described with reference to a digital video apparatus adapted to read compressed video and audio data from a disc and to process the data in accordance with the DVD specification, it is to be understood that the present invention may be used in any digital video apparatus

5 capable of processing digital video and audio data, wherein the data has been stored or is received in distinct data blocks and the data blocks may be played back according to a particular playback sequence.

Fig. 1 is a block diagram showing the basic elements of an exemplary digital video disc player suitable for implementing the dynamic playmode selection

10 feature of the present invention. The construction and operation of these elements are generally known to one of ordinary skill in the art and will not be discussed in detail here. Disc player 24 comprises motor and pickup assembly 26 which, under the control of servo processor 29, spins the disc and reads the information stored thereon. Preamp 27 and DVD data processing unit 28 translate the electrical pulses from motor

15 and pickup assembly 26 into digital data that can be further processed by digital audio/video decoder unit 30. DVD data processing unit 28 typically performs functions such as demodulation, error correction and descrambling of the raw data read from the disc so that the data is in a suitable format for decoder unit 30.

Decoder unit 30 receives the demodulated, error corrected and

20 descrambled data, processes the data, and provides the appropriate video and audio signals to a display unit 18, such as a television set. Decoder unit 30 comprises data stream demultiplexer 32 which demultiplexes the data from data processing unit 28 into a plurality of separate data streams, including a video stream, an audio stream and a subpicture stream, and provides the data streams to their respective data decoders.

25 Video decoder 31 receives the video stream and provides a video signal to mixer 33. Subpicture decoder 34 receives the subpicture stream and provides data to on-screen display (OSD) control 35 which provides OSD video signals to mixer 33. The combined video signal from mixer 33 is provided to NTSC/PAL encoder 42 which provides a video signal that conforms to the appropriate video signal standard to a

30 video display device 18. Audio decoder 36 receives the audio streams from data stream demultiplexer 32 and provide the appropriate audio signals to an audio system.

Microcontroller 40 controls the operation of disc player 24. Microcontroller 40 is coupled to user control device 41, which may comprise IR

remote control devices, front panel buttons or the like, and translates data from user control device 41 to control the operation of the various elements of disc player 24 described above. Typically, microcontroller 40 is also configured to control various access features of disc player 24 including, but not limited to, parental lock out,  
 5 decryption of encrypted discs, dialing remote controllers to gain access to encrypted DVD data. Microcontroller 40 may be embodied in various forms, including, but not limited to, a dedicated integrated circuit, or a part of a decoder/controller unit. Microcontroller 40 may be comprised of one of a plurality of suitable controller units, including, but not limited to STI 5500, manufactured by SGS Thomson.

10 Fig. 2 illustrates the navigation scheme between player domain 60 and disc domain 62. As shown in Fig. 2, player domain 60 includes player menu 61 for allowing the user to select certain operating conditions for the player, for example parental control ratings. Also, DVD domain 62 includes title menu 64 for providing information about the respective video title. On-screen selection from title menu 64  
 15 may transfer the user to title playback block 63, which includes provisions for root menu 65. Root menu 65 may be authored onto a disc to provide information about available options on the disc including, but not limited to, subtitles, audio tracks and camera angles.

If the disc does not include a root menu 65 authored thereon, it is  
 20 desirable to include a means for generating an information display, developed from the actual video and audio information stored on the disc, which identifies and displays the available options to the user. A provision for such means is indicated by information displays block 66. Although information display block 66 is shown inside DVD domain 62, the information display is generated by player 24 based on information  
 25 authored on the disc. Alternatively, disc player 24 may be configured to allow the user to select information display 75 rather than root menu 65 even if root menu 65 exists in DVD domain 62.

Fig. 3 illustrates the structure of the program data and control data stored on a disc in accordance with the DVD specification and suitable for use with  
 30 disc player 24. The data structure is hierarchical, wherein each data block is divided up into component data blocks, which are further divided into smaller component data blocks. Each video title set, which corresponds to a designated program unit, for

example, a movie or an episode of a television show, is comprised of video object sets, which comprises a plurality of video objects.

Each video object is comprised of a plurality of cells, which may be considered a data unit for presentation having a plurality of data unit types, such as video, audio, subpicture, etc, and corresponds to a program segment. Each cell is in turn comprised of a plurality of video object units (VOBUs). Each VOBV is comprised of a navigation pack (NAV\_PACK) and a plurality of packs, which are subdivided into a plurality of packets. A VOBV generally corresponds to an MPEG-2 Group of Pictures (GOP) with an associated control data structure, the NAV\_PACK. The NAV\_PACK of each VOBV contains information such as sector addresses of VOBUs relative to the current one (both forwards and backwards in temporal presentation order), and the amount of elapsed time in cell presentation which corresponds to the current VOBV.

Data stored in accordance with the DVD specification is also logically organized into a presentation structure in order to provide flexibility in the manner in which the data can be presented. Fig. 4 illustrates the presentation structure in accordance with the DVD specification and suitable for use with disc player 24. This presentation structure is overlaid onto the data structure of Fig. 3. At the base level, the presentation sequence is defined by programs (PGs) 96, each of which comprise a linked list of pointers to cells. A plurality of PGs 96 may be combined to form a program chain information (PGCI) 94, a plurality of which may in turn be combined to form program chain (PGC) 92.

During presentation of a video titles, disc player 24 selects the appropriate PGC for loading into a primary table, based on such criteria as the user selected title and parental rating preference. Thereafter, disc player 24 reads the data stored on the disc based on the linked list of pointers contained in the PGs. As is known, disc players generally utilize various look ahead algorithms in order to read the data from the disc and store the data on a system buffer prior to actual presentation in order to provide seamless presentation.

As discussed earlier, the storage medium may contain a plurality of program portions, often called chapters, which may be played back in different, user selectable orders called playmodes. Also as discussed earlier, a user is able to dynamically call up a menu and make changes to the playmode (PM) of disk player 24.

This way, while watching a program on the video display being played from a storage medium through the disk player, the user is able to call up a menu and change these different playmodes (PMs) without going through the inconvenience of stopping the disk playback and trying to restart the video playback each time the user wants to  
5 make a change.

The different playmodes (PMs) available are (1) standard; (2) random; and (3) programmable PMs. The standard PM allows chapters on a disk to be played back in the default sequence which is usually from start to end. The random PM plays back chapters in a random order. The programmable PM plays back chapters in the  
10 sequence specified by the user. In response to user input, disk player 24 determines all possible PMs and which PMs are actually available for actuation. For example, the disk player 24 determines if the storage medium contains more than one chapter in the video title set. If it does not, the player cannot change the PM to random or programmable. Further, the disk player 24 determines if the plurality of chapters on  
15 the disk can be used for play back. For example, if all chapters are R-rated and the parental control rating allows only G-rated chapter playback, then the player cannot change the PM to random or programmable.

After determining what PMs are possible and those that are actually available, a menu is generated (as illustrated in display 110 of fig. 5). If the user  
20 changes the PM, the disk player will ask the user if the change affects only the current title or all future titles. The user will then use the control device 41 to make the user election. If the player elects to change the PM only for the current video title, disk player 24 would revert to the prior PM when the playback of the current title is complete, otherwise, the selected PM remains in effect until changed by the user.

25 The various playmodes may be implemented in disk player 24 as follows. In the standard mode, disk player 24 follows the presentation sequence defined on the disk. The presentation sequence is defined by tables in the program chain information contained in the control blocks as described above. In the random mode, disk player 24 generates a private table that maps each chapter and assigns a  
30 specific value to each chapter based on the order of play. The borders for each chapter are known based on the program chain information previously loaded in from the disk. Thereafter, a random number generator is used to randomly select a chapter for presentation and a checking algorithm may be performed to ensure that each chapter is

presented at least once before any one chapter is repeated. In the programmable mode, disk player 24 accepts the desired sequence from the user and creates a private table that lists the boundary information for each of the chapters in the sequence.

Thereafter, disk player 24 presents the chapters in accordance with the listing in the private table. It can be seen that disk player 24 creates the supplemental tables from the chapter boundary information that is already loaded from the disk in order to alter the presentation sequence.

It is possible to enable and disable the dynamic selection of a playmode. Enabling/disabling of the method for implementing the displaying and dynamically selecting a PM may occur by selecting the desired mode on a setup option display created by the system's on-screen display processor during a setup mode of operation. The setup mode of operation, which enables controlling various features such as video processing characteristics, sound characteristics, closed captioning, etc., in addition to PMs selection enable/disable, may be activated, for example, by pushing a control button on a remote control device. Desired features/modes/settings are selected from the displayed setup menu by using buttons on the remote control, all in a known manner.

Figure 6 is a flowchart illustrating the steps for implementing the displaying of and dynamically selecting among particular ones of a plurality of PMs on a DVD Player. In step 127, disc player 24 waits for the user to send a PLAY command and upon receiving the PLAY command searches the disk or video title set for a plurality of PMs. In step 128, the user can press a designated button 81 to give the user the opportunity to change playmodes. In step 130, disk player 24 determines all possible PMs. In step 132, disk player 24 will determine what PMs are available, i.e., those PMs not blocked with a parent block or those not enabled. In step 134, an on-screen display 110 is overlaid, in a known manner, onto the video display generated by the disk player 24 and allows the user to change the PM while continuing to watch the title playback in a background portion of the video display. The on screen display 110 distinguishes between those PMs present and available and those that are present and unavailable. The user is allowed to select an available PM in step 136. The menu display tracks the user changes of the available PMs. In step 138, disk player 24 switches the PM to the new PM and plays it. In step 140, after disk player 24 switches and plays the new data stream, the on-screen display 110 is no longer overlaid



onto the video display generated by the disk player 24 and the video signal processing system returns to a normal display.

Figure 7 shows, in flowchart form, another embodiment of the method for implementing the displaying and dynamically selecting among a plurality of PMs on a DVD disk on a DVD Player in accordance with principles of the invention. Steps in Fig. 7 which are the same as those illustrated in Fig. 6 have the same reference number as in Fig. 6, operate in the same manner to the corresponding steps in Fig. 6 as described above, and will not be described again here. The arrangement depicted in Fig. 7 provides for selectively enabling the mode of operation in which user selects one of a plurality of different PMs. Specifically, Fig. 7 includes step 144 following step 128 which tests to determine if the access to PM is enabled. If the access to dynamically change the PM is disabled (A "NO" result at step 146), then step 144 is followed by step 142 which exits the routine without providing the user an opportunity to change the PM. In this case, changing the PM must occur prior to activation of the playback mode by navigating the usual setup menus as described above if a user desires. Otherwise, step 130, and following steps, are performed allowing a user to select a playmode.

It will be apparent to those skilled in the art that although the present invention has been described in terms of an exemplary embodiment, modifications and changes may be made to the disclosed embodiment without departing from the essence of the invention. Also, it is herein recognized that the present playmode selection feature may be implemented using any one of a number of conventionally known methods, or combination of methods, for controlling the various elements of disc player 24 described above, for example by using embedded software in a microcontroller. Therefore, it is to be understood that the present invention is intended to cover all modifications as would fall within the true scope and spirit of the present invention.

## CLAIMS

1. A method for controlling a system for processing a plurality of data units stored on a storage medium, the system adapted to process a sequence of the data units in accordance with one of a plurality of playmodes (PMs) comprising standard, random and programmed playmodes, the method comprising the steps of:

(A) playing back (127) a sequence of data units according to one of the plurality of playmodes during a PLAY mode of operation, characterized by

(B) providing (134) to a user, during the PLAY mode of operation, an opportunity to select another one of the plurality of playmodes, the plurality of playmodes including a standard playmode representing a default sequence, a random playmode representing a random sequence and programmed playmode representing a sequence specified by a user, without interrupting playback of a current sequence of data units, and

(C) in response to user selection of a new playmode, changing (138) the playback sequence of the data units in accordance with the newly selected playmode.

2. The method of claim 1, characterized in that step (B) comprises the step of generating (134) an on-screen display overlaid onto a video display which allows the user to select one of the plurality of playmodes while continuing to watch the playback of the data units in a background portion of the video display.

3. The method of claim 2, characterized in that step (B) is preceded by the step of determining (144) whether a mode of operation enabling selection of one of the plurality of playmodes during the PLAY mode of operation is enabled; and

performing steps (B) and (C) only if the mode of operation enabling modification of the plurality of playmodes during the PLAY mode of operation is enabled.

4. The method of claim 3, characterized in that the step of determining whether user modification of a playmode is enabled is preceded by the step of determining (127,128) whether the system is in the PLAY mode of operation.

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5. The method of claim 4, characterized in that:  
the system comprises a DVD player (30) and the storage medium comprises a DVD disk;  
the DVD disk includes a plurality of chapters; and  
10 the plurality of playmodes represent respectively different sequences of chapters.

6. The method of claim 1, characterized in that step (B) comprises the steps of:

15 determining (130) the maximum number of the plurality of playmodes which may be performed with the storage medium;  
determining (132) which of the number of the maximum number of the plurality of playmodes are actually possible with the storage medium;  
generating (134) an on-screen menu displaying the maximum number of  
20 the plurality of playmodes, and which of the maximum number of the plurality of playmodes are actually possible .

7. The method of claim 6, characterized in that step (B) further comprises, after the generating step, a step of allowing (136) the user to select  
25 from among the plurality of playmodes actually possible on the storage medium.

8. The method of claim 1, characterized in that step (C) is preceded by the step of allowing the user to select whether the newly selected playmode will be effective for all future playbacks or only the current playback.

9. Apparatus for processing data units stored on a storage medium according to a particular playback sequence, the apparatus comprising:

playback circuitry (26,27,28,30) for accessing and processing data units  
5 stored on the storage medium during a PLAY mode of operation;

a user control device (41) for receiving user input; and

a control unit (40), coupled to the playback circuitry and the user control device, for conditioning the playback circuitry to activate the PLAY mode of operation and process the data units in a particular playback sequence in  
10 response to user selection of one of a plurality of playmodes, characterized in that

the control unit provides to a user during the PLAY mode of operation an opportunity to select from among the plurality of playmodes, the plurality of playmodes including a standard playmode representing a default sequence, a  
15 random playmode representing a random sequence and programmed playmode representing a sequence specified by a user, without interrupting the PLAY mode of the playback circuitry, and, in response to user selection of a new playmode, changing the playback sequence of the data units in accordance with the newly selected playmode.

10. The apparatus of claim 9, further characterized by an on-screen display control (35) coupled to the control unit (40), the on-screen display control providing a menu (110) representing the plurality of playmodes allowing the user to select one of the plurality of playmodes while watching a playback of  
25 a current sequence of data units in a background portion of the video display.

11. The apparatus of claim 9, characterized in that the control unit determines whether a mode of operation enabling selection of one of the plurality of playmodes during the PLAY mode of operation is enabled; and provides an  
30 opportunity to select a new playmode without interrupting the PLAY mode only if the mode of operation enabling modification of the plurality of playmodes during the PLAY mode of operation is enabled.

12. The apparatus of claim 9, characterized in that the playback circuitry comprises means for accessing and processing data from a DVD disk and the storage medium comprises a DVD disk, wherein the DVD disk includes a plurality of chapters; and the plurality of playmodes represent respectively different sequences of chapters.

13. The apparatus of claim 9, characterized in that control unit is adapted to determine the maximum number of the plurality of playmodes which may be performed with the storage medium, to determine which of the number of the maximum number of the plurality of playmodes are actually possible with the storage medium, and to provide an on-screen menu displaying the maximum number of the plurality of playmodes and which of the maximum number of the plurality of playmodes are actually possible.

14. The apparatus of claim 9, characterized in that the control unit provides an on-screen display to allow the user to select whether the newly selected playmode will be effective for all future playbacks or only the current playback.

SCANNED, # 12

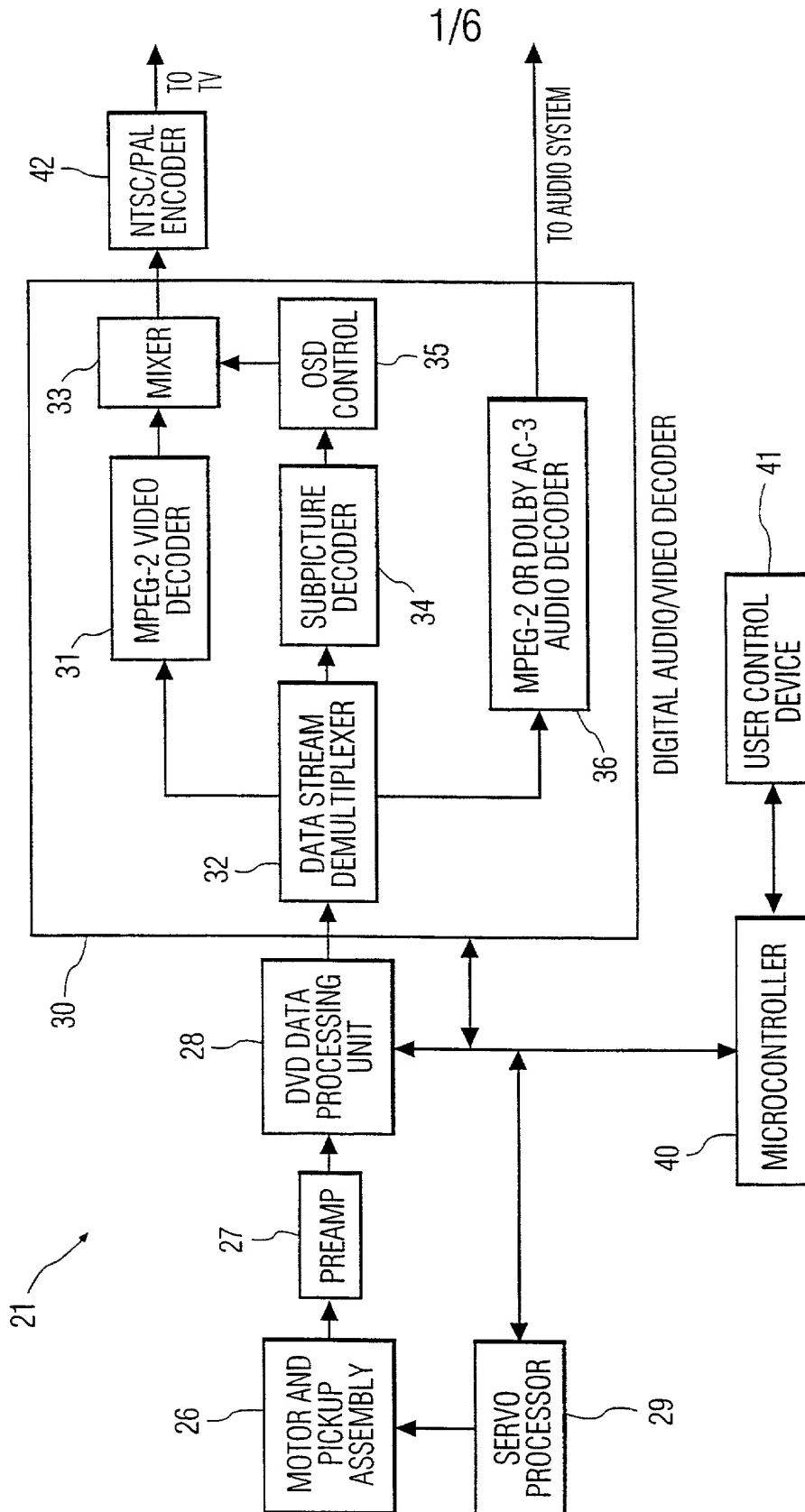


FIG. 1

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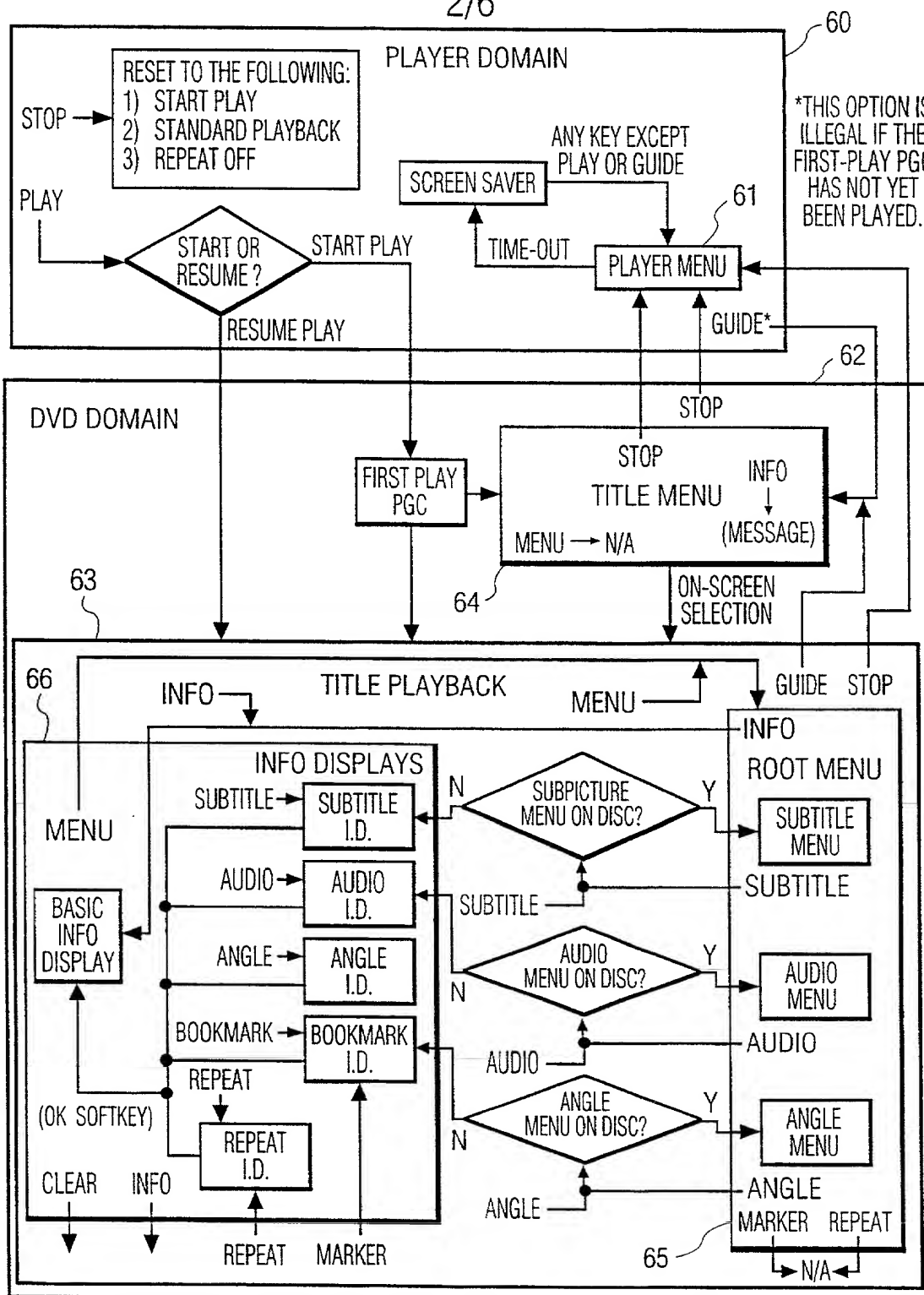
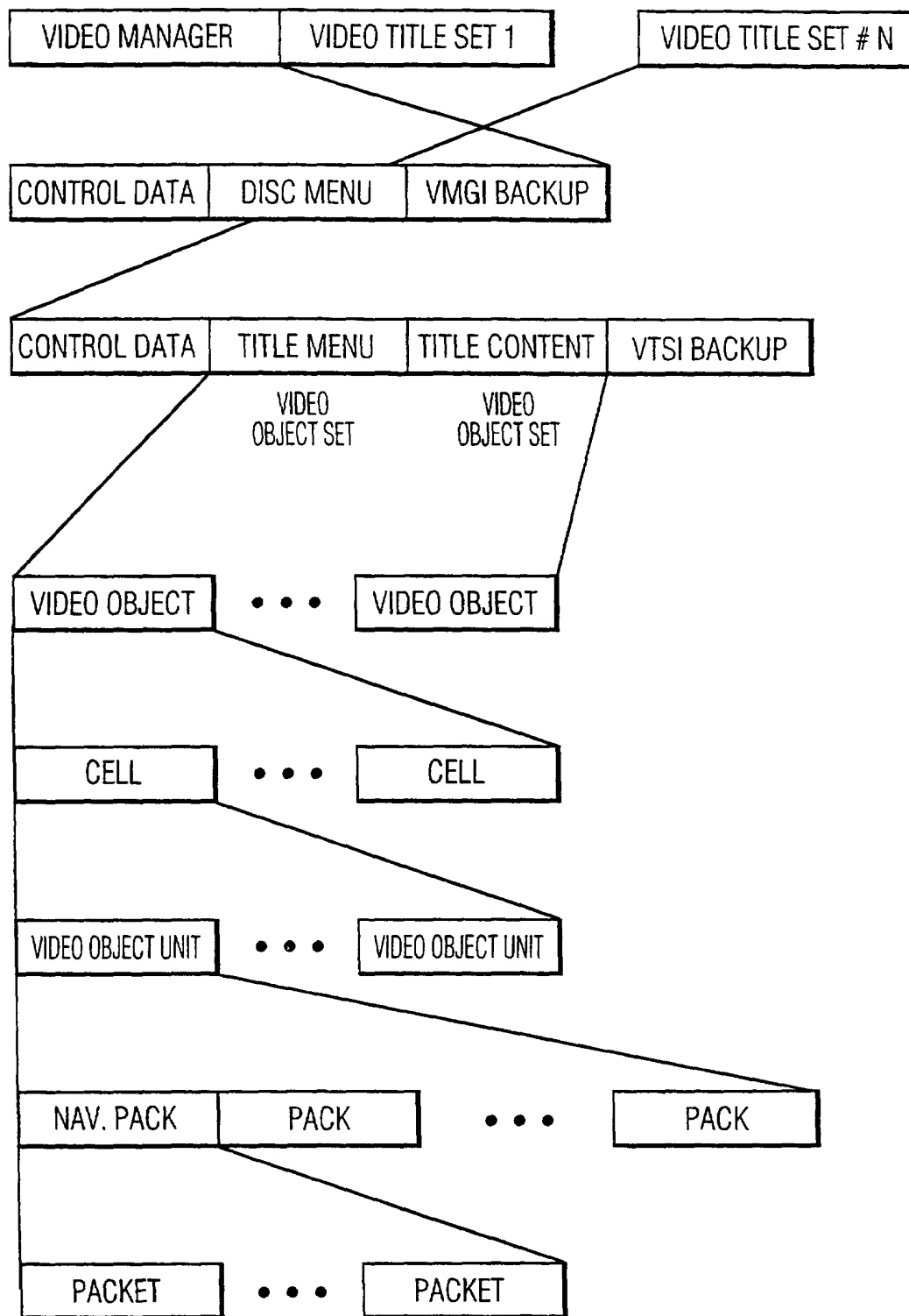


FIG. 2

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SCANNED, # 18

FIG. 3



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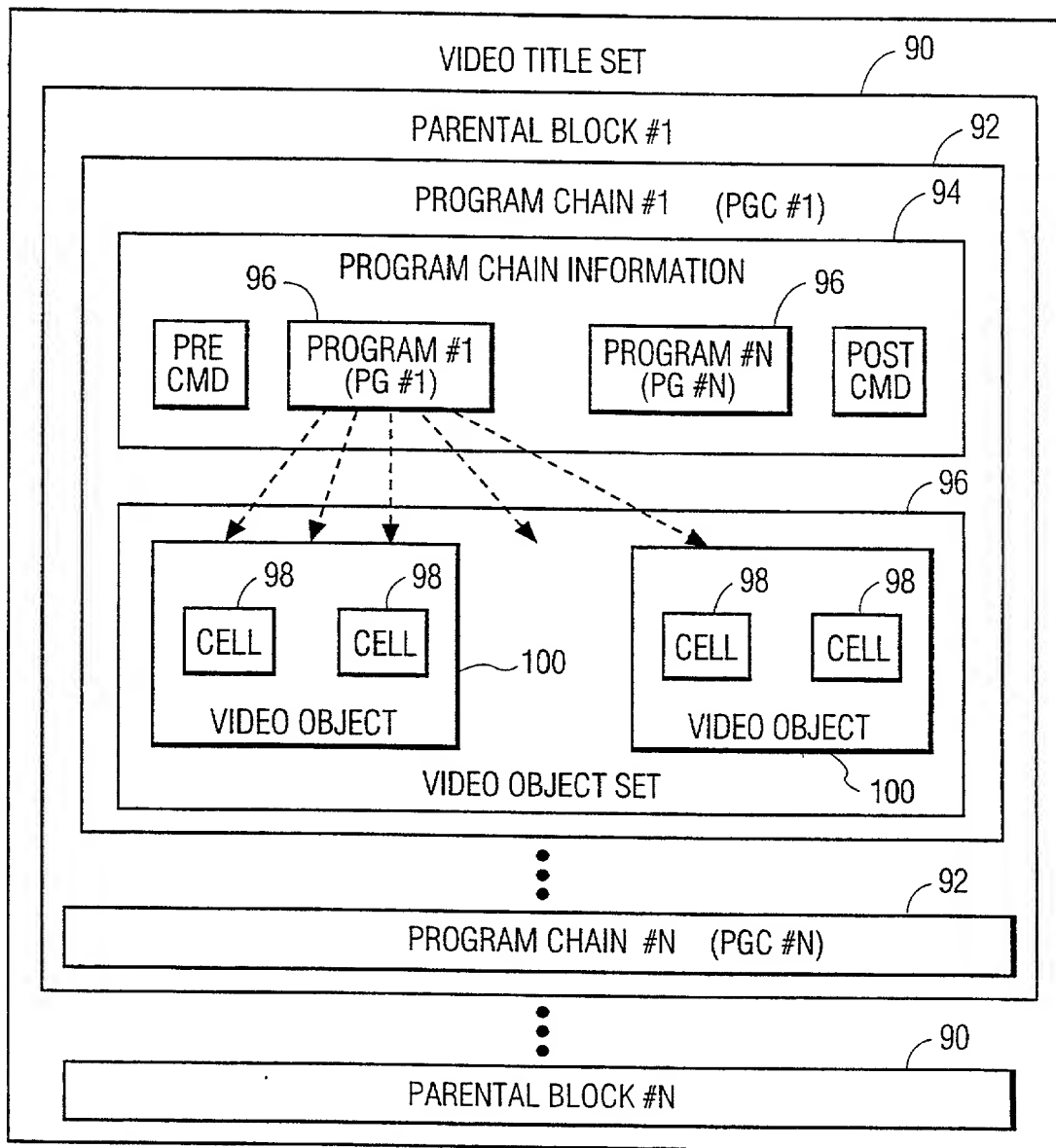


FIG. 4

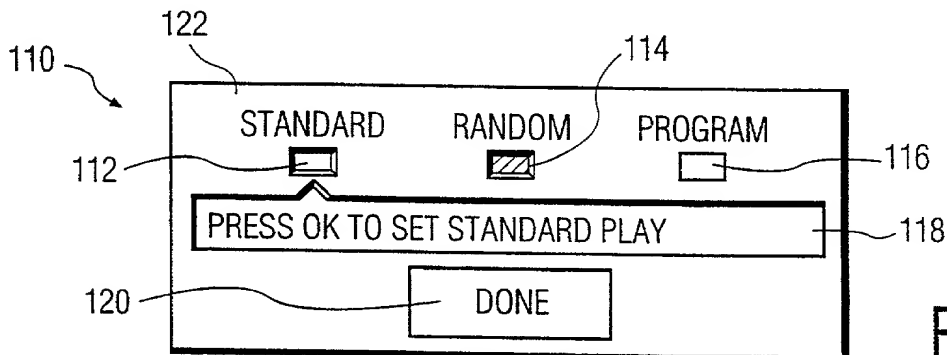


FIG. 5

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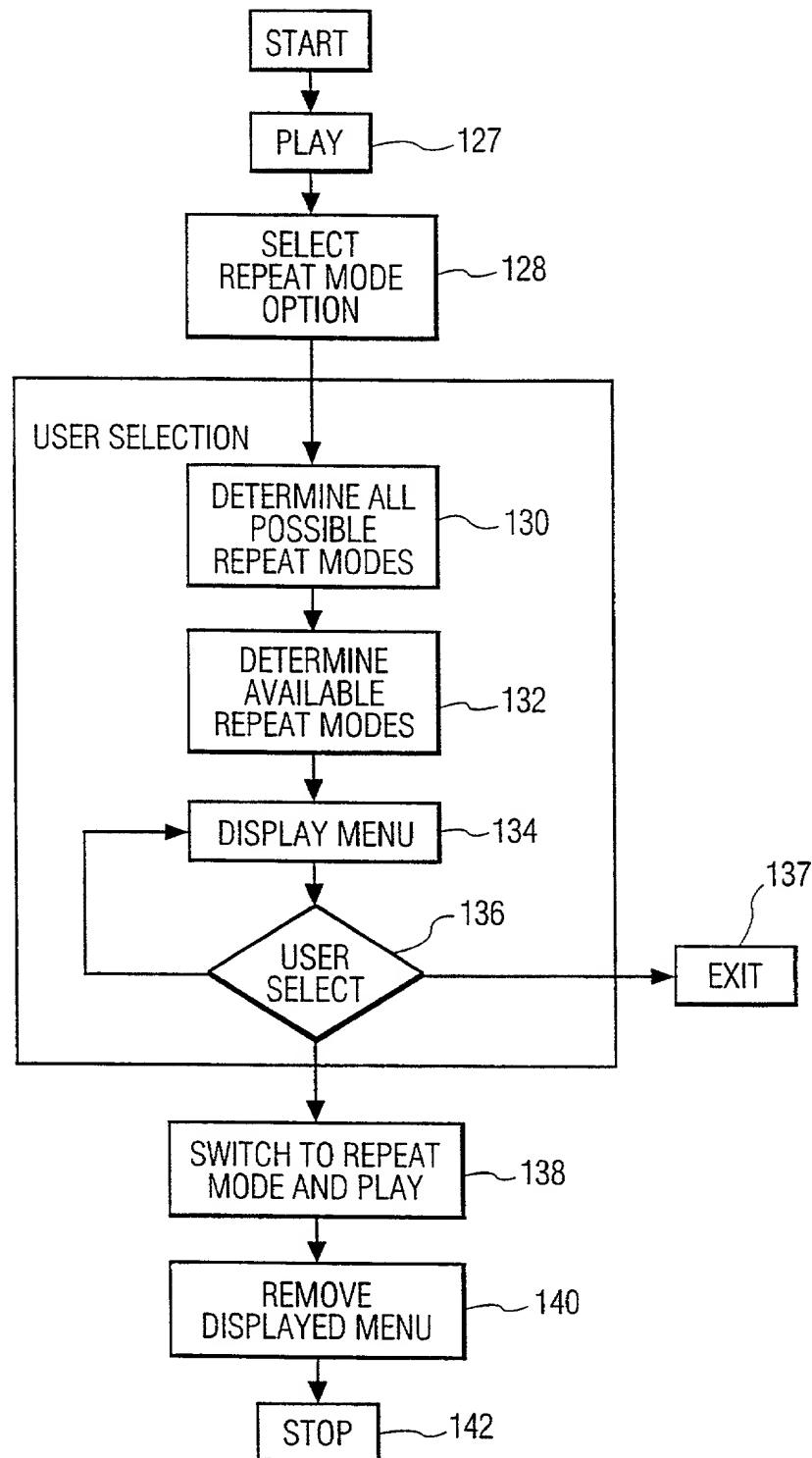


FIG. 6

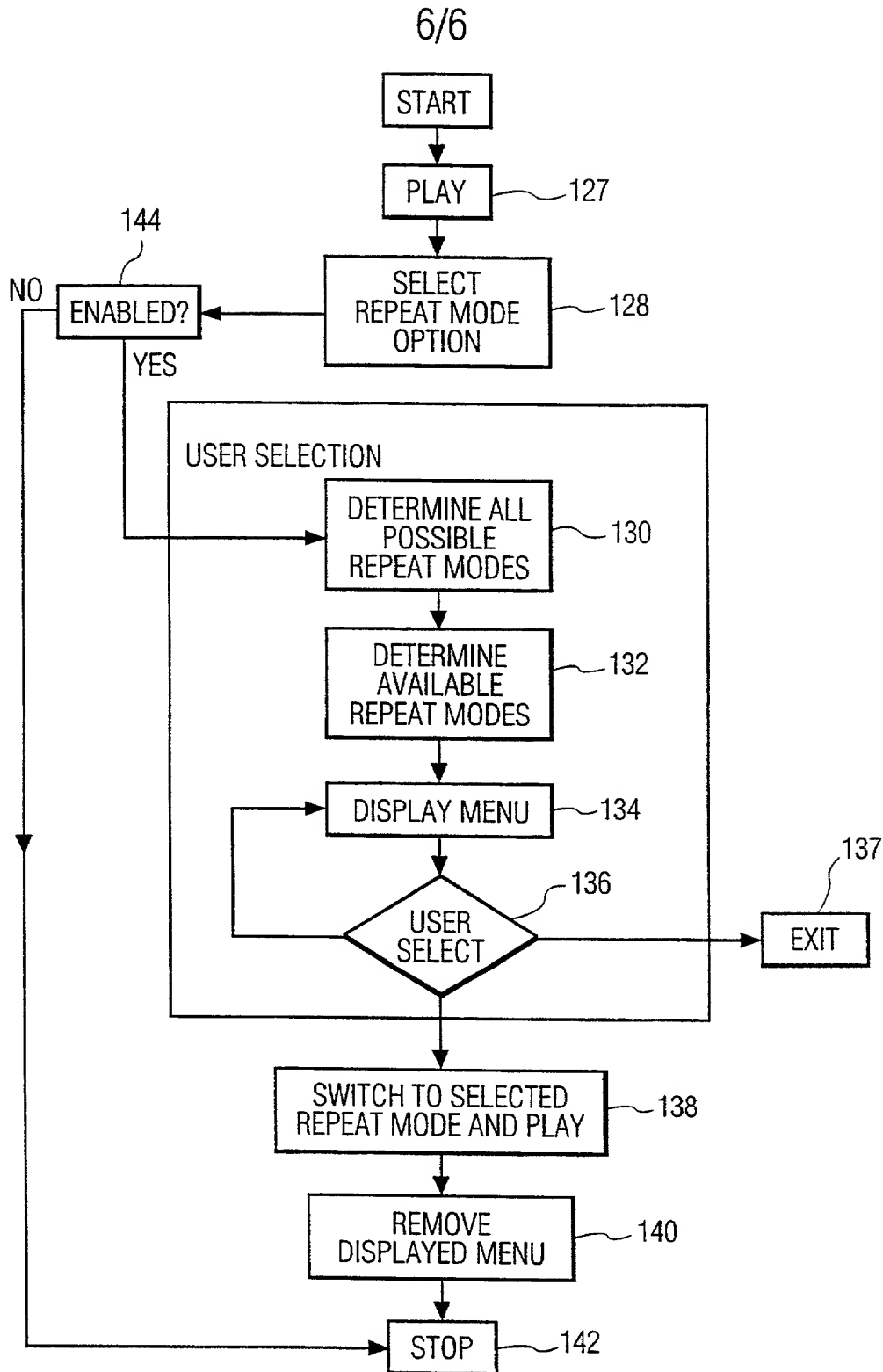


FIG. 7

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PTO/SB/01 (10-00)  
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<b>DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION</b> (37 CFR 1.63)  <input type="checkbox"/> Declaration Submitted with Initial Filing    OR <input checked="" type="checkbox"/> Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16(e)))	<b>Attorney Docket Number</b>	RCA 88649
	<b>First Named Inventor</b>	Debbie Indira Lewis
	<b>COMPLETE IF KNOWN</b>	
	<b>Application Number</b>	/
	<b>Filing Date</b>	
	<b>Group Art Unit</b>	
	<b>Examiner Name</b>	

**As a below named inventor, I hereby declare that:**

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**DIGITAL VIDEO APPARATUS USER INTERFACE**

the specification of which (Title of the Invention)

☐ is attached hereto  
OR  
☒ was filed on (MM/DD/YYYY) **July 20, 1999** as United States Application Number or PCT International Application Number **PCT/US99/16228** and was amended on (MM/DD/YYYY) **August 29, 2000** (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above:

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign	Foreign Filing Date	Priority	Certified Copy Attached?
			YES NO
		<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)
60/093,424	July 20, 1998

☐ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

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**DECLARATION — Utility or Design Patent Application**

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Mailing Address

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**DECLARATION — Utility or Design Patent Application**

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Date

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City **Leawood**State **KS**ZIP **66206-1811**Country **US**☐ Additional inventors are being named on \_\_\_\_\_ supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.